New Developments in Sheep Production
Occasional Publication No. 14—British Society of Animal Production 1990
edited by C. R. F. Slade and T. L. J. Lawrence

A COMPARISON OF THREE TERMINAL SIRE BREEDS FOR CROSSBRED LAMB PRODUCTION

2. CARCASS EVALUATION

G. M. WEBSTER[1], M. ELLIS and B. G. MERRELL[2]

[1]*Department of Agriculture, The University, Newcastle upon Tyne NE1 7RU*
[2]*MAFF/ADAS, Redesdale EHF, Rochester, Otterburn, Newcastle upon Tyne NE19 1SB*

INTRODUCTION

Increasing emphasis is being placed on lamb carcass quality, particularly in terms of lean meat production and conformation. Within systems of sheep production in the United Kingdom, one of the main influences on lamb growth and carcass quality is the choice of terminal sire. However, while a number of sire breed comparisons have been undertaken in the past (Wolf, Smith and Sales, 1980; Cameron and Drury, 1985; Kempster, Croston, Guy and Jones, 1987), none has compared directly three breeds of current interest — Suffolk, Texel and Charollais. This paper therefore reports on the evaluation of carcasses from crossbred lambs sired by rams of these three breeds which had been used in the performance trial described in the companion paper (Merrell, Webster and Ellis, 1990).

MATERIAL AND METHODS

Details of the ewe flock, the selection of rams and the management of the sheep are described by Merrell *et al.* (1990). The crossbred progeny of the three terminal sire breeds (Suffolk, Texel and Charollais) were selected for slaughter when it was estimated that they would produce carcasses of Meat and Livestock Commission (MLC) fat class 2 to 3L. All lambs had been multiple-born and reared as twins out of Mule ewes (Bluefaced Leicester ♂ × either Scottish Blackface or Swaledale ♀).

In the first 2 years of the 3-year trial, about 60 carcasses from each of the three sire breeds were subjected to full-side dissection. The carcasses were first divided into eight standardized commercial joints and then separated by butcher's knife into lean, subcutaneous fat, intermuscular fat, bone and a small waste component, using the procedure described by Cuthbertson, Harrington and Smith (1972). In each year, the carcasses were obtained over four slaughter dates at approximately 1-month intervals and, in total, carcasses representing six rams from each breed were dissected. Equal numbers of male and female lambs were included and in the 1st year both ewe types were equally represented. In the 2nd year, only one ewe type (Bluefaced Leicester ♂ × Scottish Blackface ♀) was used.

The data were subjected to least-squares analysis of variance (Harvey, 1977) with the model used accounting for the effects of sire breed, year, ram within sire breed within year, sex of lamb, slaughter date and all first order interactions. Carcass fat class was used as a covariate.

TABLE 1
Carcass classification data from crossbred lambs of three terminal sire breeds

	Suffolk	Texel	Charollais	Approx. s.e.d.
No. of carcasses	61	61	64	
Fat class†	9·92	9·38	9·97	0·398
Conformation‡	2·95	2·76	2·95	0·187
Live weight at slaughter (kg)	41·0	39·8	40·5	0·69
Carcass weight (kg)	17·9	18·0	18·1	0·39
Killing-out proportion (g/kg)	442	452	447	4·4

† Estimated percentage subcutaneous fat. All other data corrected to a common fat class of 9·77.
‡ MLC conformation score E = 5, P = 1.

RESULTS

Carcass classification data are shown in Table 1 from which it can be seen that there was no significant breed difference in carcass fat class. Nevertheless, since the Texel-cross carcasses tended to have a lower fat class than those of the other two breeds, all other data were corrected to a common fat class of 9·77 using covariance analysis. At the same fat class, there were no significant differences between Suffolk, Texel and Charollais-cross lambs in live weight at slaughter, cold carcass weight or killing-out proportion, but Texel lambs tended to be of poorer conformation than those sired by the other two breeds.

Within the dissected sides, the weights of lean, intermuscular fat and subcutaneous fat were not significantly different between breeds, but carcasses from Texel-sired lambs tended to have less fat and more lean than those from the other two breeds as shown in Table 2. There were significant differences ($P < 0{\cdot}01$) between breeds in the total weight of bone in the carcasses, with Suffolk crosses having more bone than those of the Texel or Charollais.

When the tissue composition of the carcasses is presented on a proportional basis, similar trends are evident. It can be seen from Figure 1 that carcasses from Texel crosses tended to have a higher proportion of lean ($P < 0{\cdot}1$) and a lower proportion of fat than those from the other two sire breeds, while Suffolk-cross carcasses had a significantly higher proportion of bone ($P < 0{\cdot}05$).

DISCUSSION

The analysis of the MLC fat class of the carcasses from the three sire breeds confirms that lambs were selected for slaughter at similar levels of estimated subcutaneous fat cover. The slightly lower value of the Texel-cross carcasses compared with those of the other two breeds was corrected by the covariance analysis.

It is interesting to compare the breed differences in conformation scores observed in this trial with those of other authors. Cameron and Drury (1985) found a trend towards better conformation in Charollais crosses compared with the Texel while in two separate analyses, Kempster *et al.* (1987) found no significant differences in conformation between Texel- and Suffolk-sired lambs, although in one of these the Texel produced a 0·04 advantage over the Suffolk. The results reported here are therefore not inconsistent with these findings,

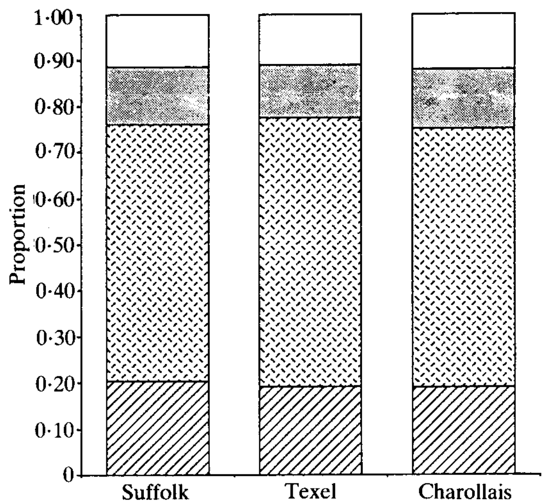

FIG. 1. Carcass composition: □ subcutaneous fat; ▨ intermuscular fat; ▨ lean; ▨ bone.

TABLE 2

Weight of lean, fat and bone dissected from the left side of carcasses from crossbred lambs†

	Suffolk	Texel	Charollais	Approx. s.e.d.
Weight of side before dissection (kg)	8·8	8·7	8·7	0·13
Weight of (kg):				
Lean:	4·76	4·93	4·78	0·109
of which — *m. longissimus*	0·49	0·50	0·49	0·008
— *m. psoas*	0·08	0·08	0·08	0·002
Fat:	2·09	1·93	2·14	0·114
of which — intermuscular	1·08	0·99	1·10	0·066
— subcutaneous	1·02	0·96	1·03	0·049
Bone:	1·72^{a}	1·63^{b}	1·62^{b}	0·028
of which — vertebral	0·55^{c}	0·50^{d}	0·51^{d}	0·016
— other	1·17^{a}	1·15^{ab}	1·12^{b}	0·017

† All data corrected to a common fat class of 9·77.
Breed means with different superscripts differ significantly: ^{ab} $P < 0{\cdot}01$; ^{cd} $P < 0{\cdot}05$.

although the trend towards inferior conformation of the Texel compared with the Suffolk crosses is surprising. The value of conformation as a predictor of carcass composition within and between breeds has been discussed in some detail by Kempster, Croston and Jones (1981).

Differences between breeds in live weight at slaughter, carcass weight, side weight and killing-out proportion were all small and non-significant. The values reported here, and their ranking, are consistent with those found in other breed comparisons, given the variation between trials (More O'Ferrall and Timon, 1977a; Wolf *et al.,* 1980; Cameron and Drury, 1985; Kempster *et al.,* 1987).

The trend towards an increased lean and reduced fat content of the carcasses from Texel-cross lambs compared with those of the other two crosses is supported by the results of individual comparisons between Suffolk and Texel (More O'Ferrall and Timon, 1977b; Croston, Kempster, Guy and Jones, 1987) and Texel and Charollais (Cameron and Drury, 1985) sires. Collectively, these data demonstrate a consistent advantage of the Texel as a terminal sire in terms of carcass lean, although this is achieved at the expense of daily live-weight gain (Wolf *et al.*, 1980; Cameron and Drury, 1985; Merrell *et al.,* 1990). The significantly higher proportion of bone in the carcasses of Suffolk crosses than in the Texels was also found by Wolf *et al.* (1980) when compared at the same level of fatness. Similarly, the rankings of the Texel and Charollais crosses in this characteristic, although not significant, is consistent with the results of Cameron and Drury (1985).

These preliminary data therefore provide considerable support to the inferences that can be made from a comparison of other trials using the same breeds (see Wolf and Smith, 1983; Cameron and Drury, 1985). A full analysis of the 3-year trial is required to confirm these results.

ACKNOWLEDGEMENTS

The assistance of the Suffolk, Texel and Charollais breed societies with the selection and identification of suitable, unrelated sires is gratefully acknowledged. Carcass dissection was undertaken by Mr R. K. Little to whom we are grateful.

REFERENCES

Cameron, N. D. and Drury, D. J. 1985. Comparison of terminal sire breeds for growth and carcass traits in crossbred lambs. *Animal Production* **40:** 315-322.

Croston, D., Kempster, A. J., Guy, D. R. and Jones, D. W. 1987. Carcass composition of crossbred lambs by ten sire breeds compared at the same carcass subcutaneous fat proportion. *Animal Production* **44:** 99-106.

Cuthbertson, A., Harrington, G. and Smith, R. J. 1972. Tissue separation — to assess beef and lamb variation. *Proceedings of the British Society of Animal Production (New Series)* **1:** 113-122.

Harvey, W. R. 1977. *User's Guide, for LSM L76. Mixed model least-squares and maximum likelihood computer program.* Ohio State University, Columbus. (Mimeograph).

Kempster, A. J., Croston, D., Guy, D. R. and Jones, D. W. 1987. Growth and carcass characteristics of crossbred lambs by ten sire breeds, compared at the same estimated carcass subcutaneous fat proportion. *Animal Production* **44:** 83-98.

Kempster, A. J., Croston, D. and Jones, D. W. 1981. Value of conformation as an indicator of sheep carcass composition within and between breeds. *Animal Production* **33:** 39-49.

Merrell, B. G., Webster, G. M. and Ellis, M. 1990. A comparison of three terminal sire breeds for crossbred lamb production. 1. Growth performance and carcass classification. In *New Developments in Sheep Production* (ed. C. F. R. Slade and T. L. J. Lawrence), *Occasional Publication, British Society of Animal Production No. 14,* pp. 169-172.

More O'Ferrall, G. J. and Timon, V. M. 1977a. A comparison of eight sire breeds for lamb production. 1. Lamb growth and carcass measurements. *Irish Journal of Agricultural Research* **16:** 267-275.

More O'Ferrall, G. J. and Timon, V. M. 1977b. A comparison of eight sire breeds for lamb production. 2. Lamb carcass composition. *Irish Journal of Agricultural Research* **16:** 277-284.

Wolf, B. T., and Smith, C. 1983. Selection for carcass quality. In *Sheep Production* (ed. W. Haresign), pp. 493-514. Butterworths, London.

Wolf, B. T., Smith, C. and Sales, D. I. 1980. Growth and carcass composition in the crossbred progeny of six terminal sire breeds of sheep. *Animal Production* **31:** 307-313.

https://doi.org/10.1017/S0263967X00002275 Published online by Cambridge University Press